

1. A steering wheel assembly for a vehicle comprising:
- a non-circular steering wheel;
- an airbag module mounted to the steering wheel, the airbag module including an airbag inflator, an inflatable airbag cushion, and an airbag module housing; and
- a deployable reaction surface for providing or receiving a reaction force for the airbag cushion when deployed and inflated.
2. The steering wheel assembly of claim 1, wherein the deployable reaction surface is a component of the airbag module.
3. The steering wheel assembly of claim 2, wherein the deployable reaction surface is at least portion of the airbag module housing which deploys to provide a reaction force for the inflatable airbag cushion.
4. The steering wheel assembly of claim 3, wherein the deployable reaction surface is at least two individual portions of the airbag module housing which deploy to provide a reaction force for the inflatable airbag cushion.
5. The steering wheel assembly of claim 3, wherein the portion of the airbag module housing which deploys to provide a reaction force for the airbag cushion is positioned to deploy into a position about the steering wheel.

6. The steering wheel assembly of claim 5, wherein the portion of the airbag module housing deploys into a position about the steering wheel not occupied by a portion of the steering wheel and below a space occupied by the airbag cushion when inflated.

5 7. The steering wheel assembly of claim 4, wherein the at least two individual portions of the airbag module housing included in the reaction surface are positioned at about the 12:00 and 6:00 positions of the steering wheel.

8. The steering wheel assembly of claim 4, wherein the individual portions of the airbag module housing included in the reaction surface comprise movable plates.

10 9. The steering wheel assembly of claim 8, wherein the movable plates are hinged plates positioned about the airbag cushion in the airbag module which deploy outwardly upon inflation of the airbag cushion.

10. The steering wheel assembly of claim 9, wherein the movable plates are spring-loaded.

15 11. The steering wheel assembly of claim 9, wherein the movable plates include locking hinges to permit deployment to a predetermined position.

12. The steering wheel assembly of claim 2, wherein the deployable reaction surface is a portion of the inflatable airbag cushion.

13. The steering wheel assembly of claim 12, wherein the deployable reaction surface comprises a reaction arm portion of the inflatable airbag cushion which contacts a portion of a steering wheel, steering column or steering wheel shroud of a vehicle.

14. The steering wheel assembly of claim 13, wherein the deployable reaction surface of the inflatable airbag cushion includes more than one reaction arm portion.

15. The steering wheel assembly of claim 1, wherein the deployable reaction surface is a component of the steering wheel.

16. The steering wheel assembly of claim 15, wherein the steering wheel includes handles, wherein the handles are comprised of first and second handle portions which separate to provide a more evenly distributed reaction surface for an airbag cushion.

17. The steering wheel assembly of claim 15, wherein the steering wheel includes a flexible sheet for deployment about the steering wheel to provide a reaction force to an airbag cushion.

18. The steering wheel assembly of claim 17, wherein the steering wheel includes at least two flexible sheets.

19. The steering wheel assembly of claim 17, wherein the flexible sheet is housed in at least one handle of the steering wheel, wherein the handle of the steering

wheel is comprised of first and second handle portions that can separate to deploy the flexible sheet.

20. The steering wheel assembly of claim 19, wherein the first and second handle portions are separated by a pyrotechnic device.

5 21. The steering wheel assembly of claim 19, wherein the first and second handle portions are separated by an electronic solenoid switch.

22. The steering wheel assembly of claim 15, wherein the deployable reaction surface further includes at least one portion of the airbag housing.

10 23. The steering wheel assembly of claim 21, wherein the deployable reaction surface includes two individual portions of the airbag housing.

24. An airbag module for use with a non-circular steering wheel comprising:

an airbag inflator;

an airbag cushion, the airbag cushion having an occupant face and a reaction face;

15 an airbag module housing; and

a deployable reaction surface, wherein the deployable reaction surface deploys from the airbag module upon activation of the airbag module to provide a reaction surface to an inflated airbag cushion.

25. The airbag module of claim 24, wherein the deployable reaction surface includes at least a portion of the airbag module housing.

26. The airbag module of claim 25, wherein the portion of the airbag module housing is a hinged movable plate positioned about the airbag cushion that deploys outwardly upon inflation of the airbag cushion.

27. The airbag module of claim 26, wherein the hinged movable plate is spring-loaded.

28. The airbag module of claim 26, wherein the hinged movable plate includes locking hinges to permit deployment of the plate to a predetermined position.

29. The airbag module of claim 26, wherein the deployable reaction surface includes two portions of the airbag module housing.

30. The airbag module of claim 29, wherein the two portions of the airbag module housing are hinged movable plates positioned about the airbag cushion that deploy outwardly upon inflation of the airbag cushion.

31. The airbag module of claim 29, wherein the hinged movable plates are spring-loaded.

32. The airbag module of claim 29, wherein the hinged movable plates include locking hinges to permit deployment of the plates to a predetermined position.

33. An airbag module for use with a non-circular steering wheel comprising:  
an airbag inflator;  
an airbag cushion, the airbag cushion having an occupant face and a  
reaction arm portion that extends to abut a vehicular steering wheel, steering  
column or steering wheel shroud when installed in a vehicle and inflated to  
provide a reaction surface for the airbag cushion; and  
an airbag module housing.

34. The airbag module of claim 33, wherein the airbag cushion comprises two  
steering wheel shrouds.

35. A non-circular steering wheel comprising a deployable reaction surface  
for a steering wheel mounted airbag cushion.

36. The non-circular steering wheel of claim 35, wherein the non-circular  
steering wheel includes two handles comprised of first and second handle portions that  
separate to deploy a deployable reaction surface.

37. The non-circular steering wheel of claim 36, wherein the reaction surface  
is a flexible sheet.

38. The non-circular steering wheel of claim 36, wherein the reaction surface  
is a webbing.

39. The non-circular steering wheel of claim 36, wherein the grip portions are opened by a pyrotechnic device.

40. The non-circular steering wheel of claim 36, wherein the grip portions are opened by an electronic solenoid switch.

5 41. An airbag module for use with a non-circular steering wheel comprising:  
an airbag inflator;  
an airbag cushion, the airbag cushion having an occupant face and a  
reaction face; and

an airbag module housing including a deployable reaction surface,  
10 wherein the deployable reaction surface deploys from the airbag module upon  
activation of the airbag module to provide a reaction surface to an inflated airbag  
cushion.

42. The airbag module of claim 41, wherein the deployable reaction surface is  
a hinged movable plate positioned about the airbag cushion that deploys outwardly upon  
15 inflation of the airbag cushion.

43. The airbag module of claim 42, wherein the hinged movable plate is  
spring-loaded.

44. The airbag module of claim 42, wherein the hinged movable plate includes  
locking hinges to permit deployment of the plate to a predetermined position.

45. The airbag module of claim 41, wherein the deployable reaction surface includes two hinged movable plates positioned about the airbag cushion that deploy outwardly upon inflation of the airbag cushion.

46. The airbag module of claim 45, wherein the hinged movable plates are  
5 spring-loaded.

47. The airbag module of claim 45, wherein the hinged movable plates include locking hinges to permit deployment of the plates to a predetermined position.

48. An airbag module for use with a non-circular steering wheel comprising:  
an airbag inflator;

10 an airbag cushion, the airbag cushion having a cushion portion that inflates toward a vehicle occupant and two reaction arm portions that extend away from a vehicle occupant to contact a vehicular steering column when installed in a vehicle and inflated, thus allowing the steering column to serve as a reaction surface for the airbag cushion; and

15 an airbag module housing.

49. A non-circular steering wheel comprising two handles comprising first and second handle portions that separate to deploy two deployable reaction surfaces.

50. The non-circular steering wheel of claim 49, wherein the deployable reaction surfaces are flexible sheets.



51. The non-circular steering wheel of claim 49, wherein the deployable reaction surfaces are webbing.

52. The non-circular steering wheel of claim 49, wherein the grip portions are opened by a pyrotechnic device.

5 53. The non-circular steering wheel of claim 49, wherein the grip portions are opened by an electronic solenoid switch.